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REDAKTION:

N. Fabritius Buchwald

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Trykningen afsluttet September 1968.
With the death on the 8th of June, 1967 of the mycologist and phytopathologist IVAR JØRSTAD Ph. D., Norway lost one of its best botanists and most distinguished research workers in agriculture, horticulture, and silviculture. It may be that the world's premier uredinologist had passed away.

IVAR JØRSTAD was born on the 14th of July, 1887 at Hitra in South Trøndelag, grew up at Frosta in North Trøndelag, and took his artium examination at Trondheim in 1906. After a period which included pioneering in Australia he took up the study of chemistry, zoology, geography, and geology at Oslo University and graduated
with botany as his main subject in 1919. He studied phytopathology at the University of Wisconsin, where he received his M. Sc. in 1920. In 1934 he was awarded a Ph. D. at Oslo University, for the thesis entitled "A Study on Kamchatka Uredinales".

He was a member of the Norwegian Scientific Academy in Oslo from 1936 onwards, and was given that body's FRIDTJOF NANSEN award in 1953 for his mycological works. He was also a member of the American Phytopathological Society, American Mycological Society, British Mycological Society, Société mycologique de France, Torrey Botanical Club in New York, Vereinigung für angewandte Botanik, and the Indian Phytopathological Society.

In 1958 he became Dr. agric. et artis silv. h.c. of Helsinki University and Dr. agro. h.c. of the Royal Veterinary and Agricultural College, Copenhagen. In the same year he was also awarded H. M. King OLAV's gold service medal.

From 1920 onwards he was the Norwegian Government Mycologist, and held this post till he retired at the age of 70 in 1957.

In this capacity Dr. JØRSTAD was the consultant for the whole of Norway on questions of diseases in horticulture, agriculture, and silviculture. For the first 20 years he had no regular assistance, but later, by engaging more scientifically trained people he built up the Norwegian Phytopathological Institute, which since 1946 has been called the Division of Plant Pathology of the Norwegian Plant Protection Institute.

Each summer he travelled around to see as much as possible for himself and to give advice on various forms of disease and damage. Between his trips he always found time to answer the many enquiries that had come in. In the winter, when travelling did not demand much of his time, he could concentrate on the study of pathogenic fungi, most of them collected by himself during the summer. Besides trips in Norway he also undertook mycological investigations in other countries, e.g. in Iceland in 1937 and 1939, the Canary Islands in 1954 and 1957, and the Balearic Islands in 1960.

He made intensive use of his sharp powers of observation and keen intellect, combined with an almost incredible memory, to gain direct personal experience in the fields of mycology and phytopathology.

JØRSTAD made a systematic and critical study of all the literature of value on mycology and phytopathology, and gradually built up a mycological and phytopathological library to such an efficient
standard that it could bear comparison with any in the world. The indexes which he compiled are unbelievably comprehensive. His special index of literature dealing with rust fungi is probably the biggest and best in the world.

At the same time as he investigated the very comprehensive material he collected so eagerly on his many journeys, he also worked through most of the mycological collections, including that in the Botanical Museum of the University of Oslo. Everything was specified and catalogued, so that it was possible for him — and for the rest of us — to find immediately the desired information about collections, with specification of substratum, locality, and date. JØRSTAD also received mycological material from other countries, and his great experience and knowledge came to be highly appreciated — and exploited — by mycologists all over the world.

His great personal experience, his literary knowledge, the library, the collections, the indexes, all formed for him a many-sided instrument which he used with a fiercely burning interest. His scientific output is very large. In the first place it covers various aspects of mycology. Among other things he described a large number of species and lower systematic units of fungi; for instance, about 100 new species of rust fungi. These were his speciality, and it is doubtful whether any other mycologist has excelled him in this field. He wrote numerous works on rust fungi in Europe, Asia, Africa, Australia, and North and South America. Uredinologists all over the world are now building further on his writings, which contain a wealth of accurate information about, and assessment of, geographic distribution, nomenclature, morphology, and ecology. For instance, it is no more chance that JØRSTAD is the author most quoted in the survey published by Z. M. AZBUKINA in 1967 on the distribution of rust fungi in the Far East (Mycology and Phytopathology 1: 6-17).

But JØRSTAD also wrote important works on such subjects as the Erysiphaceae and other Ascomycetes, the Polyporaceae, Ustilaginales, and Fungi Imperfecti. Particularly valuable is: „Parasittsoppene på kultur- og nyttevekster i Norge. I. Sekksporesopper (Ascomycetes) og konidiesopper (Fungi imperfecti). Melding fra Statens plantepatologiske institutt nr. I. Oslo 1945“. His last two major works deal with the genus Septoria and septorioid fungi on dicotyledons and monocotyledons in Norway.

Besides these purely mycological works, JØRSTAD wrote numerous reports and other phytopathological works which have been of great
practical importance for horticulture, agriculture, and silviculture. Together with the Government Entomologist T. H. Schøyen he wrote books on pests and diseases in the fruit and berry orchard, on farm crops, and on vegetable crops.

In his work as Government Mycologist he always kept his eye on the fact that it was primarily Norwegian agriculture that he was to help. In the course of his many journeys he was a frequent and welcome guest of instructors and practitioners of agriculture, horticulture, and silviculture. When plants or trees were stunted or died, then Jørstad was called in, or he was sent samples and descriptions of the damage. In case after case he found out the cause, whether it was climatic damage or poisoning, or whether the damage was caused by viruses, bacteria, or fungi. When once the reason was clear, advice could usually be given.

Jørstad was a plain and sober-minded man. His working day was well ordered — long and intensive, but never harassed. He was fearless in all he did, and always spoke his mind. But though his criticism could be keen, there was never any hint of malice in it. For this reason he was widely respected and liked.

Now that Ivar Jørstad is gone, it remains for us to conserve what he created and to continue the work that he began.

CLAVARIACEAE DANIAE
SPECIES ESPECIALLY COLLECTED IN
THE ISLE OF ZEALAND

By M. P. CHRISTIANSEN

SUMMARY

Descriptions are given of 39 species, 8 varieties and 2 forms of Clavariaceae. Of these Ceratellopsis acuminata, Clavaria acuta, C. affinis, C. fumosa, C. Gibbsiae var. megaspora and var. tenuis, C. rosea var. subglobosa, C. sphagnicola, Clavulina cristata var. subcinerrea, Clavulinopsis coliformis, C. fusiformis, C. pulchra, Lentaria afflata, L. epichnoa, Ramaria aurea, R. eumorpha, Ramariopsis Kunzei are not earlier reported from Denmark. In additions two new species Aphelaria acericola and Ramaria pseudobotrytis and two new forms Clavulinopsis corniculata f. compacta and Ramaria stricta f. compacta are described.

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INTRODUCTION

During twenty-five years (1919-1944) the present author lived at the little Danish town Køge in the eastern part of the Isle of Zealand, and there he had the opportunity of studying the larger fungi in many forests in that part of the country, but not before now he has got time to published his gatherings of the species of the genus Clavaria and allied genera.

Below species of the genera Aphelaria, Ceratellopsis, Clavaria, Clavariadelphus, Clavulina, Clavulinopsis, Lentaria, Pterula, Ramaria and Ramariopsis shortly are described and illustrated. Two new species Aphelaria acericola and Ramaria pseudobotrytis and two new forms Clavulinopsis corniculata forma compacta and Ramaria stricta forma compacta are described.

For the determination of the species the work of Corner (1950) has been an invaluable help.

ABBREVIATIONS

The following abbreviations are used in the descriptions:

N. F. B. = N. Fabritius Buchwald.
J. L. = J. Lind.
F. H. M. = F. H. Møller.
E. R. = E. Røstrup.
M. P. C. = M. P. Christiansen.
! = author's collections.
(C) = in Botanical Museum, Copenhagen.
(CP) = in Department of Plant Pathology, Copenhagen.

Geographical localities:

F. = Falster
J. = Jutland
L. = Lolland
Z. = Zealand
1. Dimitic. Fruit-bodies bushy, densely branched and tufted, 1-5 cm high, white, yellowish, greyish; spores 4.5-6.0 × 2-3 μ; in coniferous humus ...... 8. Pterula multifida, p. 144
   Monomitic ........................................................................................................ 2

2. Spores yellow, ochraceous, or brown, smooth or variously marked, mostly guttulate; fruit-bodies branched, often large and highly coloured; terrestrial or lignicolous .............. 9. Ramaria, p. 145
   Spores white; fruit-bodies branched, or simple .......... 3

3. Spores minutely echinulate; fruit-bodies branched, pale whitish; most terrestrial .......... 10. Ramariopsis, p. 155
   Spores smooth, or rarely with large warts .................. 4

4. Lignicolous ........................................................................................................ 5
   Humicolous or terrestrial, or on dead plant remains ...... 7

5. Very small, simple, 0.5-10 mm high ...... 2. Ceratellopsis, p. 121
   Fruit-bodies branched......................................................................................... 6

6. Branches upwards somewhat flattened, in drying horney ...
   Branches not flattened, brittle .................. 1. Aphelaria, p. 120
   7. Lentaria, p. 412

7. Humicolous; simple, large and clavate to slender, yellow, brown, rufescens................. 4. Clavariadelphus, p. 128
   Mostly terricolous; simple, rarely branched; generally fleshy or brittle .................. 8

8. Basidia 2-spored, cylindrical to subclavate; sterigmata usually strongly incurved; spores smooth, broadly ellipsoid to sub-globose ................................................................. 5. Clavulina, p. 132
   Basidia 4-spored, clavate, with straight sterigmata ........ 9

9. Hyphae without clamps; fruit-bodies simple or branched, mostly brittle; spores aguttulate or multiguttulate ............ 3. Clavaria, p. 122
   Hyphae clamped; fruit-bodies simple or branched, fleshy or somewhat brittle; spores mostly 1-guttate ............. 6. Clavulinopsis, p. 136
1. **Aphelaria** Corner 1950.

Fruit-bodies mostly branched, with flattened multifid, then bifid branching, often with filiform tips, coriaceous, white, pale grey, yellowish to brownish.

Mostly terrestrial, few lignicolous.

Basidia clavate; sterigmata 2-4; spores white, smooth, subglobose to elongate ellipsoid; cystidia and gloeocystidia absent; hyphae monomitic, not inflated, long-celled, becoming slightly thick-walled, typically without clamps, colourless.

**Type-species**: *A. dendroides* (Jungh.) emend. Corner.

**Aphelaria acericola** n. sp.

Fig. 1a, p. 120 and fig. 1 b and c, p. 121.

Fructificatio gregaria, ramosa vel ramosissima, pallida vel laete pallido-rufescens, c. 0.5-1 cm alta; ramis ramosis, saepe teretiusculis, ramulis acutis vel interdum applanatis, fimbriatis; caro pallida, cornea.

Hyphae hyalinae, cylindraceae, tenuiter vel subcrasse tunicatae, non noduloso-septatae, 2-6 μ diam; basidia clavata, c. 36 X 7-9 μ, 2-4 sterigmata gerentia; sporae hyalinae, cylindraceae vel subcylindraceae, subundulatae, 10-13 X 3.5-5 μ, tunicis tenuibus laevibus.

Ad cortices *Aceris pseudoplatani*. Dania. Type (C).

Fruit-bodies up to 1 cm high and wide, gregarious, branched from the base, when dry drab or pallid tan (nearly jl); tips terete, elongate and acute or slightly flattened and cristate; drying horny.

Hyphae cylindric, somewhat thick-walled, 2-6 μ broad, clamps not seen; basidia clavata, c. 36 X 7-9 μ, with 2-4 sterigmata, up to 8 μ long; spores white, cylindric or subcylindric, somewhat undulate, thin-walled, smooth, 10-13 X 3.5-5 μ.

On bark of still living trunk of *Acer pseudoplatanus*.

This species resembles *Lentaria byssiseda* Corner which species also has cylindric spores, nearly of the same size, but deviates by having thin-walled hyphae with large clamps, its branches are brittle, not horny and its fruit-body is whitish ochraceous.

2. **Ceratellopsis** Konr. & Maubl. 1927.

   Fig. 2, p. 122.

   Fruit-bodies filiform, very small, simple, 0.5-10 mm long, acute, apex sterile; stem very short.
   Basidia with 2-4 sterigmata; spores white, smooth; cystidia absent; hyphae monomitic.
   On various plant remains.
   Lecto-typus: *Ceratellopsis aculeata* (Pat.) Corner.

**Ceratellopsis acuminata** (Fckl.) Corner 1950.


Fruit-bodies simple, 1.2-3.3 × 0.12-0.36 mm, stem c. 0.26 mm long, gregarious, filiform to narrowly fusiform, acute, white then yellowish, apex sterile.
Hyphae in the apex parallel, 2-2.4 μ wide, thin-walled, stem hyphae up 5.2 μ wide, thin-walled, with granulate contents; basidia clavate, c. 16 × 5.5 μ, 2-4 sterigmata, up to 8 μ long; spores nearly oval, 5.5-7 × 2.8-3.5 μ, thin-walled, smooth.

On rotten wood.

Find: Z. Hareskoven (45 a), Dec. 4. 1965, leg. K. HAUERSLEV.

3. **Clavaria** Vaill. ex Fr. s. str. 1821.

Fruit-bodies branched, or generally simple, often caespitose, brittle, white, rosy, purple, violet, or grey; stem distinct or indistinct; terrestrial.

Basidia mostly 4-spored; spores white, generally smooth, thin-walled; hyphae thin-walled, inflating, without clamps, compact.

Type-species: *C. vermicularis* Fr.

**Key to Species**

1. Spores globose, subglobose to broadly ovate .......................... 2
   Spores ellipsoid to broadly ellipsoid ............................... 4

2. Spores globose, granular-guttulate; fruit-bodies simple, 2-8 cm high, narrowly clavate .......................... 1. *C. acuta*, p. 123
   Spores subglobose to broadly ovate, guttate to guttulate;
   fruit-bodies simple .................................................. 3

*) *Clavaria incarnata* WEINM. and *Clavaria rosea* Fr., vide Appendix p. 156.
3. Fruit-bodies 10-12 cm high, white, tips withering brown ...

2. *C. Gibbsiae* var. *megaspora*, p. 124

Fruit-bodies 3-6 cm high, white ..........................................

2a. *C. Gibbsiae* var. *tenuis*, p. 124

4. Fruit-bodies with yellow stem, simple ................................ 5

Fruit-bodies without conspicuous stem .................................. 7

5. Fruit-bodies rosy, 3-5 cm high; spores broadly ellipsoid, 6-7.5 × 4.5-5.5 µ ....... 3. (?) *C. rosea* var. *subglobosa*, p. 125

Fruit-bodies pale, whitish yellow, alutaceous .......................... 6

6. Fruit-bodies 3-8 cm high; on the ground ............................ 4. *C. argillacea*, p. 125

Fruit-bodies until 11 cm high; among *Sphagnum* .................. 5. *C. sphagnicola*, p. 126

7. Fruit-bodies sparingly branched, caespitose, purple, violet ...

6. *C. purpurea*, p. 126

Fruit-bodies simple, often caespitose, white to whitish, or ± fuligeneous ................................................................. 8


Fruit-bodies white, whitish, or slightly yellowish ...................... 9

9. Fruit-bodies 6-10 cm high, cylindric, then elongate fusiform, caespitose ................................. 8. *C. vermicularis*, p. 127

Fruit-bodies c. 4 cm high, clavate, solitary ... 9. *C. affinis*, p. 128

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1. **Clavaria acuta** Fr. 1821.

Icones: [Corner] 1950, pl. 2, f. 4, *Clavaria acuta*.


Fruit-bodies simple, solitary, white, 2-8 cm high and c. 3 mm wide, cylindric, obtuse, becoming depressed and slightly sulcate, brittle; stem c. 1 cm × 1-1.5 mm; smell and taste none.

Basidia clavate, 3-4 sterigmata; spores white globose to subglobose, thin-walled, 5-7 µ wide, with granular-guttulate contents.

In pasture and in forests.


![Fig. 3. *Clavaria acuta* Fr. — Køge Strand. a. Fruit-body (× 1/4); b. Spores (×1000).](image-url)
2. **Clavaria Gibbsiae** RAMSB. var. **megaspora** CORNER 1950.

![Fig. 4. Clavaria Gibbsiae RAMSB. var. megaspora CORNER. — Fuglsang Skov. a. Fruit-bodies (× 1/2); b. Spores (× 1000).](image)

Fruit-bodies simple, caespitose, 10-12 cm high, 4-7 mm wide, cylindric and obtuse to elongate fusiform and acute, becoming flattened, sulcate and slightly undulate, white, tips withering brown; stem 1-2 cm × 2-3 mm; flesh white, brittle.

Spores subglobose to broadly ellipsoid, smooth, thin-walled, guttulate or guttate, 7.5-10 × 7-9 μ.

On the ground in forest (*Fagus*).

Finds: Z. Fuglsang Skov near Køge (40), Nov. 10, 1942!

2 a. **Clavaria Gibbsiae** RAMSB. var. **tenuis** CORNER 1950.

![Fig. 5. Clavaria Gibbsiae RAMSB. var. tenuis CORNER. Køge Strand. a. Fruit-body (× 1/2); b. Spores (× 1000).](image)

Fruit-bodies simple, solitary or in small groups, 3-6 cm high 3-4 mm wide, cylindric, subclavate, obtuse to subacute, becoming compressed, slightly sulcate, white, brittle; stem up to 2 cm high, 1-1.5 mm wide; smell and taste none.

Basidia clavate, with 3-4 sterigmata; spores white, subglobose to oval, thin-walled, smooth, guttate or guttulate and with large gutta, 7.5-10.5 × 5.5-8 μ.

In pastures.

Finds: Z. Køge Strand (40), Nov. 4, 1942! and Nov. 3, 1943!
3. (?) *Clavaria rosea* Fr. var. *subglobosa* Corner 1950.

Icones: M. P. C. 1943 (C).

Lit.: J. L. 1913, p. 370 (?), n. 1752, *Clavaria rosea* Fr.

Fruit-bodies 3-5 cm high, simple, solitary or in groups of few specimens, with distinct, bright yellow (b 5*) stem, 2 cm × 1 mm; club cylindric, 1.5-2 mm wide, ± obtuse, finely longitudinally folded, pale reddish (g 1 - g 2 or j 2).

Basidia 2-4 spored; spores white, subglobose or broadly ellipsoid, thin-walled, smooth, with granular-guttulate contents, 5.6-7.5 × 4.5-5.5 μ.

Among grass in wood.

Finds: Z. Jægersborg Dyrehave (45 a), Oct. 3. 1943.

4. *Clavaria argillacea* Fr. 1821.

Icones: Juilliard-Hartmann 1919, vol. 5, pl. 216, f. 15 (sub. *C. ericetorum* Pers); Konr. & Maubl. 1934, pl. 494, f. 2; F. H. M. 1940 and 1953 (C); Corner 1950, pl. 2, f. 2; Michael-Hennig II, 1960, f. 126, p. 255.

Lit.: J. L. 1913, p. 370; F. & W. 1928, p. 50, f. 38 and 1943, p. 49, f. 43.

Fruit-bodies simple, solitary or gregarious, 3-8 cm high, 2-8 mm wide, cylindric, becoming clavate and obtuse, compressed, with 1-2 longitudinal furrows, whitish-yellow, alutaceous to cream; stem up to 1.5 cm long, clear yellow; rather brittle.

Spores white, smooth, ellipsoid to subcylindrical, thin-walled, multiguttulate, 9-12 × 4.5-6 μ (Corner).


*) Jakob E. Lange's colour-table (Dansk Bot. Arkiv, Bd. 4, Nr. 12, 1926).
5. **Clavaria sphagnicola** Boud. 1917.

Syn.: *C. argillacea* Fr. var. *sphagnicola* (Boud.) Corner 1950.

Icones: Boud. 1917, pl. 4, f. 3; M. P. C. 1938 (C).

Fruit-bodies simple, c. 10 cm high, 4-5 mm wide, clavate and subacute, often compressed, longitudinally furrowed and minutely rugulose, pale argillaceous yellow; stem 1.5 mm wide, clear pale yellow with white mycelium at the base.

Spores broadly ellipsoid with somewhat obscure walls and with slightly yellowish granular contents, 8-9 × 5-6 μ.

Among *Sphagnum*.

Corner considers the species a variety of *C. argillacea* Fr.

Finds: Z. Køge Aas (40), Oct. 13, 1938!

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6. **Clavaria purpurea** Fr. 1821.

Icones: F. H. M. 1940 (C).


Fruit-bodies up to 5 cm high, simple or dichotomous branched, generally caespitose, tufted, at the base c. 3 mm wide, tips blunt, purple to violet.

Spores white, ellipsoid, thin-walled, with granular contents, 5-7.5 × 3.5 μ.

Among grass in wood.

Finds: Z. Vallø Dyrehave (40), May 28, 1935 and Sept. 1, 1940!; Jægersborg Dyrehave (45 a), Sept. 18, 1943! and J. P. Jensen.
7. **Clavaria fumosa** Fr. 1821.

Fruit-bodies simple, caespitose, up to 8 cm high, 3-5 mm wide, cylindric, flexuous obtuse to subacute, sometimes sulcate, pale mouse-grey to fuligineous, brittle.

Spores white, ellipsoid to pip-shaped, thin-walled, smooth, with granular contents or sometimes with a little gutta, 5-7 $\times$ 3.5-4 $\mu$.

Among grass in wood.

Finds: Z. Jægersborg Dyrehave (45 a), Sept. 18, 1943!

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8. **Clavaria vermicularis** Fr. 1821.

**Syn.: Clavaria fragilis** HOLMSK. 1790.

Fruit-bodies simple, densely caespitose, 6-10 cm high, 3-4 mm wide, cylindric, then elongate fusiform, sulcate, often curved or flexuous, white, brittle.

Basida clavata, 4-spored; spores white, ellipsoid to pip-shaped, thin-walled, smooth, with finely granular-guttulate contents, 5-7 $\times$ 3-4 $\mu$.

Among grass in wood, Common.

9. **Clavaria affinis** Pat. et Doass. 1886.

Icones: Juillard-Hartmann 1919, Vol. 5, pl. 218, f. 6; M. P. C. 1942 (C).

Fruit-bodies simple, clavate c. 4 cm high (incl. the stem), c. 4 mm wide, obtuse, cylindric, slightly sulcate, whitish-pallid, with yellow tint; stem 18 × 1.7 mm, white.

Spores white, ovate or broadly ellipsoid with large apiculus, thin-walled, smooth, 7-8 × 4.5-5.5 μ, 1-guttate.

Among moss.

Finds: Z. Valø Strand (40), Nov. 9, 1942!

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4. **Clavariadelphus** Donk 1933.

Fruit-bodies simple, solitary, filiform to clavate, light yellow or light ochraceous at first, becoming deep ochraceous, brown or rufescens.

Basidia 4-spored; spores white, or pale yellowish. Terrestrial in humus of coniferous or frondose trees, or on dead sticks, twigs etc.

Type-species: *C. pistillaris* (L. ex Fr.) Donk.

**Key to Species**

1. Fruit-bodies very large, 7-30 × 2-6 cm; on the ground in frondose woods ......................... 1. *C. pistillaris*, p. 129
   Fruit-bodies smaller, ........................................... 2

2. Fruit-bodies 0.5-1.5 cm wide, clavate, light ochraceous, then tinged rufescens; spores 9.5-16 × 3.8-4.5 μ ... 2. *C. ligula*, p. 129
   Fruit-bodies 0.6 cm wide or less, filiform to narrowly clavate 3

3. Fruit-bodies 0.5-3 × 0.2-0.6 cm, cylindric, clavate, pale ochraceous; spores 11.5-15 × 5.5-7 μ; on dead frondose wood ...
   3a. *C. fistulosus* var. *contortus*, p. 131
   Fruit-bodies longer, more slender ................................ 4

4. Fruit-bodies 10-15 × 0.2-0.6 cm, filiform or narrowly clavate, ochraceous to rufescens or dark brown; spores 14-15.5 × 5.5-6.5 μ ........................................... 3. *C. fistulosus*, p. 130
Fruit-bodies 3-15 × 0.05-0.2 cm, filiform or subclavate; spores 6-12 × 3.5-5 μ; on humus and sticks in frondose woods and on the ground ....................... 4. C. junceus, p. 132

1. Clavariadelphus pistillaris (L. ex Fr.) DONK 1933.

Syn.: Clavaria pistillaris HOLMSKJ. 1790, p. 12, t. 4; Clavaria pistillaris L. ex FR. 1821, p. 477.


Fruit-bodies simple, clavate, 10-15 cm high, 2-4 cm wide, above obtuse, very massive, often longitudinally rugose, light yellow then more or less deep ochraceous, sometimes rufescent; brownish vinaceous on bruising; stem indistinct, white villous at base.

Spores 11-16 × 6-10 μ (CORNER).


Finds: Z. Køge Aas (40), Sept. 5. 1922.

2. Clavariadelphus ligula (Fr.) DONK 1933.

Syn.: Clavaria ligula Fr. 1821, p. 477.


Fruit-bodies simple, clavate, smooth, 3-6 cm high, 3-12 mm wide, light ochraceous then somewhat rufescent; stem indistinct, base white villous; flesh white, rather spongy.

Basidia cylindric-clavate, 32-40 × 5-6.5 μ, with 4 sterigmata; spores white, smooth, 9.5-16 × 3.8-4.5 μ.

In coniferous forests, solitary or in troops. Rather rare.

3. Clavariadelphus fistulosus (Fr.) Corner 1950.

Syn.: Clavaria fistulosa Fr. 1821, p. 479.


Fig. 13. Clavariadelphus fistulosus (Fr.) Corner. — Kohaven. a. Fruit-bodies (X 1/2); Kongelunden. b. Basidium and spores (X 1000).

Fruit-bodies simple, filiform, or narrowly clavate, 10-15 cm high, 0.2-0.6 cm wide, ochraceous to rufescens or dark brown.

Basidia clavate, c. 44 × 6.5 μ, with 4 sterigmata; spores white, narrowly pyriform, smooth, 14-16.5 × 5.5-6.5 μ.

On branches of frondose trees.

Finds: Amager, Kongelunden (46), Nov. 29, 1952!; F. Kohaven (37), Dec. 8, 1946, F. H. M.

Syn.: *Clavaria contorta* HOLMSKJOLD 1790, p. 29, t. 12; *Clavaria contorta* FR., 1821, p. 478.

Icones: HOLMSKJOLD 1790, p. 29, t. 12; CORNER 1950, p. 273, Text-Fig. 102: fruit-body, basidia and spores.


Fruit-bodies simple, cylindrical to narrowly clavate, 0.5-3 cm high, 1.5-3 mm wide, pale ochraceous to greyish brown.

Hyphae thin-walled with clamps; basidia clavate, c. 64 × 5-8.5 µ, with 2-4 sterigmata, up to 13 µ long; spores white, narrowly pyriform to fusiform, smooth, 11.5-15 × 5.5-7 µ.

On rotten wood.

4. **Clavariadelphus junceus** (Fr.) Corner 1950.

**Syn:** *Clavaria juncea* (Fr.) 1821, p. 479.

**Icons:** Julliard-Hartmann 1919, Vol. 5, t. 217, f. 9; Bres. Icon. Myc. 1922, t. 1104; Corner 1950, Text-Fig. 103, p. 276, left; Michael & Hennig II, 1960, p. 251, t. 117; F. H. M. 1955 (C).


[Image: Fig. 15. *Clavariadelphus junceus* (Fr.) Corner. — Lindeskoven. Fruit-bodies (× 4/5).]

Fruit-bodies simple, filiform, 3-10 cm high, 0.5-2 mm wide, solitary or gregarious, pallid ochraceous, becoming brownish drab; stem distinct, narrower than the fertile club, attached by appressed fibrils at the base to rotten twigs and petioles in frondose woods.

Spores 6-12 × 3.5-5.5 μ, more or less amygdaliform, white, thin-walled, smooth, aguttate (Corner).

On leaves in wet and shadowy forest of *Fagus*. Common (F. & W.).

Finds: F. Lindeskoven (37), Oct. 28, 1953, F. H. M.

5. **Clavulina** Schroet. 1888.

Fruit-bodies simple or branched, generally with flattened branching and more or less cristate tips, white, grey, fuligineous or purplish, rather brittle; mostly terrestrial.

Hyphae monomitic, often with clamps; basidia ± cylindric; sterrigmata 2; spores white, subglobose or broadly ellipsoid, with 1 large gutta.

Type-species: *C. cristata* (Fr.) Schroet.
Key to Species

1. Fruit-bodies much branched ................................................. 2
   Fruit-bodies simple, or sparingly branched ................................ 4

2. Fruit-bodies white, sometimes becoming yellowish or grey, often cristate, until 10 cm high; spores 7.5-9.5 × 6.5-8.5 μ
   1. C. cristata, p. 133

   Fruit-bodies grey, lilagrey or fuligineous ................................ 3

3. Fruit-bodies 2-3 cm high, with subulate, somewhat incurved crescentic tips; stem blackish grey
   1a. (?) C. cristata var. subcinerea, p. 134
   Fruit-bodies 3-10 cm, gregarious or caespitose, tips blunt; spores 9-12 × 6.7-9 μ ........................................ 2. C. cinerea, p. 134

4. Branches stout, blunt, often divided 1-3 times, antler-like
   3a. C. rugosa var. aleyonaria, p. 135
   Branches simple, 1-3, short, not antler-like, rugulose or sulcate ........................................ 5

5. Branches often becoming longitudinally rugulose or bullate-cerebriform, white, or yellowish ............ 3. C. rugosa, p. 135
   Branches even, then longitudinally sulate and hollow, not rugulose .................. 3b. C. rugosa var. canaliculata, p. 136

1. Clavulina cristata (HOLMSKILD ex FR.) SCHROET. 1888.

Syn.: Clavaria cristata Fr. 1821, p. 473.
Icons: HOLMSKILD 1790, p. 92, t. 6 (Ranaria cristata); JUILLARD-HARTMANN 1919, Vol. 5, pl. 216, f. 5; CORNER 1950, p. 313, Text-Fig. 124, p. 339, Text-Fig. 145, right; MICHAEL-HENNIG I, 1958, p. 237, f. 176.

Fruit-bodies 3-8 cm high, much branched, gregarious, or caespitose, stem distinct, tips acute and becoming cristate, white, often becoming ± yellowish, or ± fuligineous.

Fig. 16. Clavulina cristata (HOLMSK. ex Fr.) SCHROET. — Vallo Storsk. a. Fruit-bodies (X ½a); b. Spores (X 1000).
Spores white, subglobose, thin-walled smooth, 1-guttate, 7.5-9.5 × 6.5-8.5 μ.

On the ground in deciduous and coniferous woods. Common.


1 a. (?) *Clavulina cristata* (Holmskold ex Fr.) Schröet. var. *subcinerea* Donk 1933.

Fruit-bodies 2-3 cm high, 1.5-2 cm wide, much branched with subulate, somewhat incurved crescentic tips; stem distinct c. 1.5 cm × 1-3 mm; branches lilagrey, in drying ochraceous; stem blackish grey.

On mossy ground in woods.

Finds: Z. Hareskoven (45 a), Sept. 26, 1932, leg. N. F. B.

2. *Clavulina cinerea* (Fr.) Schröet. 1888.

Syn.: *Clavaria cinerea* Fr. 1821, p. 468.

Icons: Juillard-Hartmann 1919, Vol. 5, pl. 216, f. 6; Corner 1950, p. 310, Text-Fig. 122 and 123 and pl. 4, f. 1; Michael-Hennig II, 1960, t. 128, p. 256.


Fruit-bodies 3-10 cm high, gregarious, or caespitose, much branched, compact, dichotomous above, tips blunt, grey to dark cinereous, often with purplish tinge; stem short, c. 3 mm thick, branches becoming ± rugulose.

Basidia 2-spored; spores subglobose to broadly ellipsoid, white to yellowish, thin-walled, smooth, 1-guttate, 9-12 × 6.7-9 μ (7-8 × 6.5-7 μ*).

On the ground in deciduous and coniferous woods. Rather common.

3. **Clavulina rugosa** (Bull. ex Fr.) Schroet. 1888.

Syn.: *Clavaria rugosa* Fr. 1821, p. 473.

Icones: *Juillard-Hartmann* 1919, Vol. 5, pl. 216, f. 4; *Corner* 1950, p. 337, Text-Fig. 144, (left) and p. 339, Text-Fig. 145 (left); *Michael & Hennig* II, 1960, t. 121, p. 253; *F. H. M.* 1942 (C).


Fruit-bodies up to 12 cm high and 3-10 mm thick, simple, solitary, or subcaespitose, cylindric to clavate or sparingly branched, narrowed downwards into an indistinct stem, becoming longitudinally rugulose and more or less bullate-cerebriform, white, cream, or yellowish, sometimes ± fuliginous.

Basidia 2-spored with incurved sterrigmata; spores subglobose, thin-walled, 10-12 × 8-10 μm, with large gutta.

On the ground in woods. Common.

Finds: Z. Køge Strandskov (40), Sept. 28, 1922!; Vallø Dyrehave (40), Nov. 12, 1942! and F. H. M.; Fuglsangskov (40), Nov. 11, 1942! and F. H. M.; Bornholm. Almindingen (47), Oet. 2, 1932, leg. N. F. B.

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3 a. **Clavulina rugosa** var. *aleyonaria* Corner 1950.

Icones: *Corner* 1950, p. 337, f. 144; *F. H. M.* 1942, vide *C. rugosa* (C).

Fruit-bodies 4-6 cm high, above shortly and obtuse branched, becoming rugulose and more or less bullate-cerebriform, or longer antler-like branched.

Spores white, subglobose, thin-walled, smooth and with large gutta, 10-12 × 8-9.5 μm.

On the ground in woods and pastures.

Finds: Z. Vallø Dyrehave (40), Nov. 12, 1942!; Vallø Storskov (40), Oct. 2, 1940!.
3 b. **Clavulina rugosa** var. **canaliculata** CORNER 1950.

*Syn.: Clavaria canaliculata* Fr. 1821.
*Icones: Juillard-Hartmann, Vol. 5, pl. 218, f. 1.*

Fruit-bodies 3-6 cm high and up to 5 mm wide, simple, caespitose, cylindric and flexuous, even becoming longitudinally sulcate, brittle, white, or ± fuligineous.

Spores subglobose, thin-walled, smooth and with large gutta, 8-9.5 × 6.3-8.5 μ.

On the ground in coniferous wood.

*Finds: Z. Vallo Stor skov (40), Oct. 2, 1940!.

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6. **Clavulinopsis** Van Overeem 1923.

Fruit-bodies simple, or branched, variously coloured, white, yellow, orange, or red; stem more or less distinct, fleshy-waxy to rather tough, gregarious, or caespitose.

Hyphae monomitic, clamped; basidia mostly 4-spored; spores white, or tinged yellow from the oil-drop, smooth, or in a few coarsely echinulate, globose, pip-shaped, or ellipsoid, 1-guttate.

Terrestrial.

*Type-species: C. miniata* (Berk.) Corner.

**Key to Species**

1. Spores echinulate, subglobose; fruit-bodies yellow to orange, simple ................................................ 1. *C. helvola*, p. 137

1a. *C. helvola* var. *geoglossoides*, p. 138

Spores smooth; fruit-bodies simple or branched ............ 2

2. Simple ........................................................................... 3

Branched ................................................................. 6

3. Spores subglobose or globose-angular .......................... 4

Spores ellipsoid, distinctly longer than broad ............. 5
4. Fruit-bodies caespitose, up to 14 cm high, fusiform, hollow, bright yellow; spores subglobose, strongly apiculate, 5-7 × 4.5-6 μ ........................................... 2. C. fusiformis, p. 138
Fruit-bodies solitary or gregarious, subclavate, obtuse, transversely plicate; spores globose-angular, c. 6 μ wide ............ 3. C. coliformis, p. 139

5. Fruit-bodies orange; spores with strong apiculus, 5-7 × 3.5-4.5 μ ...................................................... 4. C. pulchra, p. 139
Fruit-bodies yellow to yellow-orange; spores with slight apiculus, 6-8 × 3-4 μ ........................................... 5. C. luteo-alba, p. 140

6. Fruit-bodies 3-8 cm high, yellow, egg-yellow, or ochraceous, smelling of new meal; bifurcate tips crescentic; spores ± globose, 4-6 μ wide ................. 6. C. corniculata, p. 140
Fruit-bodies up to 4 cm high, pale greyish-yellow, compact; smell often none; spores ± globose, 3.7-5.5 μ ................. 6a. C. corniculata forma compacta, p. 141

1. Clavulinopsis helvola (Fr.) Corner 1950.

Syn.: Clavaria helvola Fr. 1821, p. 482; Clavaria dissipabilis Britzelmayer 1885, p. 289; Clavaria inaequalis Auct.

Icons: Konr. & Maubl. 1934, pl. 493, f. 2, C. dissipabilis Britz., t. 734; Corner 1950, pl. 10, f. 2, C. helvola; F. H. M. 1940 (C); M. P. C. 1943 (C); M. & J. N. 1967, p. 413.

Fruit-bodies 3-6 cm high, 2-3.5 mm wide simple, solitary, or in small clusters, narrowly clavate to subcylindric, obtuse, rarely with a short branch at the apex and then compressed, bright yellow to orange-yellow, brittle to tough; stem paler, or citron-yellow, white at base.

Spores subglobose-subangular, cream, bluntly echinulate, processes 1-2 μ long, 1-guttate, 5-6 μ wide (excl. the spines).

On the ground in woods, or among grass. Cfr. C. luteo-alba.


Fig. 21. Clavulinopsis helvola (Fr.) Corner.—Jægersborg Dyrehave. a. Fruit-bodies (× \(1/2\)); b. Spores (× 1000).
1a. **Clavulinopsis helvola** var. *geoglossoides* CORNER 1950.

![Fig. 22. Clavulinopsis helvola (Fr.) CORNER var. *geoglossoides* CORNER.](image)

- **Fruit-bodies** simple, 5-6 cm high, c. 5 mm wide, clavate, subacute, compressed, longitudinally grooved, or cerebriform folded, bright yellow to reddish yellow; stem 2 cm × 1-1.5 mm, white to pale citron-yellow, and somewhat villose.

- **Spores** of the same type as above.

**Finds:** Z. Krageskov (40), many specimens, Sept. 22, 1943!; Sorgenfri Slotspark near Mølleåen (45 a), Aug. 27, 1960, leg. B. Rønne; Kejlsø (36), Oct. 18, 1940, F. H. M.

2. **Clavulinopsis fusiformis** (Sowerby ex Fr.) CORNER 1950.

![Fig. 23. Clavulinopsis fusiformis (Fr. ex Sowerby) CORNER.](image)

- **Fruit-bodies** 3-4.5 cm high, 3-4 mm wide, simple, fasciculate, bright yellow, darker with age, fusiform, acute, longitudinally sulcate; stem indistinct, white, villose.

- **Spores** white, broadly pip-shaped, orb subglobose with a strong apiculus, 1-guttate, or multiguttulate, 5-7.5 × 4.5-6 μ.

**Finds:** Z. Køge Strandskov (40), Oct. 25, 1942!; Jægersborg Dyrehave (45 a), Sept. 18, 1943! (P. A.).

Syn.: Clavaria coliformis Boud. 1917, p. 11.
Icones: BOUD. 1917, t. 3, f. 2; JUILLARD-HARTMANN 1919, Vol. 5, pl. 219, f. 3; M. P. C. 1942 (C); F. H. M. (C).

Fruit-bodies 3-5 cm high, 4-8 mm wide, simple, solitary, or gregarious, cylindric-clavate, obtuse, transversely plicate, and longitudinally sulcate, bright yellow to tawny ochraceous, white at the base; the hymenium not distinct from the stem.

Spores white, thin-walled, smooth, globose-angular, c. 6 μ wide, 1-guttate,
On the ground among grass. Rare.

Hitherto the species seems to be known from France only. The author considers the species a good one.

Finds: Z. Køge Strandskov, among grass, (40), Nov. 11. 1942 and Nov. 3. 1943!


Syn.: Clavaria pulchra PECK 1876, p. 53, t. 1, f. 10; Clavaria rufa PERS. sensu MOLLER 1945, p. 112.
Icones: PECK 1876, t. 1, f. 10; CORNER 1950, pl. 8, f. 4 and 5.

Fruit-bodies simple, solitary, fasciculate, c. 6.5 X 0.3 cm, cylindric to narrowly fusiform, somewhat rugulose, clear yellow to orange, drying deep orange; stem short, but distinct, base whitish.

Basidia narrow clavate, c. 35 X 7 μ, with 4 sterigmata; spores white, ± ovoid to broadly ellipsoid, or subglobose, with a strong, often sublateral apiculus, 1-2-guttate, 5-7 X 3.5-4.5 μ

On the ground in woods. Rare.


Syn.: Clavaria luteo-alba REA 1903, p. 66.

Icones: CORNER 1950, pl. 8, f. 1 and 2; F. H. M. (1940) (C); M. P. C. 1943 (C).

[Lit.: E. R. 1904, p. 68 (C. inaequalis MULL.); J. L. 1913, p. 369 (C. inaequalis MULL.); F. & W. 1928, p. 49, f. 37 (C. inaequalis Fr.) and 1943 p. 49, f. 42 (C. inaequalis MULL.).]

Fruit-bodies 4-8 cm high, 1-3 mm wide, simple, often caespitose in small groups, cylindric, narrowly clavate, or elongate fusiform, acute to blunt, often flexuous and longitudinally sulcate, yellow to orange; stem short and somewhat indistinct.

Spores white, ellipsoid, thin-walled, smooth, with large gutta, apiculus slight, 6-8 × 3-4.5 μ.

On the ground in pastures and woods. Common.

The species C. luteo-alba and C. helvola look very much alike and can only be distinguished by the spores.

Clavaria inaequalis in the sense of Danish mycologists is, I suppose, most often C. luteo-alba.

Finds: Z. Krageskov under Picea and Fagus (40), Sept. 28, 1943!; Køge Strand among grass and moss (40), Oct. 12, and 22, 1943!; Sorgenfri Slotspark near Mølleåen (45 a), leg. B. Rønne, Aug. 27, 1960; Falster (37), Nov. 5, 1942, leg. F. H. M.; Kejlsø (36), Oct. 18, 1940, F. H. M.


Syn.: Ramaria muscoides HOLMSK. 1790, p. 87; Clavaria corniculata Fr. ex SCHAEFF. 1821, p. 471; Clavaria pratensis Fr. 1821, p. 471; Clavaria fastigiata Fr. 1838, p. 571.

Icones: HOLMSKILD 1790, t. 4, Ramaria muscoides; Juillard-Hartmann 1919, Vol. 5 pl. 214, f. 8; CORNER 1950, pl. 10, f. 1; MICHAEL & HENNIG II, 1960, p. 255, t. 127; F. H. M. 1940 (C); M. P. C. 1943, f. 1 and 2 (C).
Fig. 27. *Clavulinopsis corniculata* (SCHAEFF. ex FR.) CORNER. Billesborg-Engen. a. Fruit-body ($\times \frac{2}{3}$); b. Spores ($\times 1000$). — *Clavulinopsis corniculata* (SCHAEFF. ex FR.) CORNER forma *compacta* n. f. Billesborg-Engen. c. Fruit-body ($\times \frac{2}{3}$); d. Spores ($\times 1000$).


Fruit-bodies branched, 3-8 cm high, yellow, or ochraceous-yellow, generally branched dichotomously two to three times, with incurved crescentic, subulate tips, rather tough, gregarious, or caespitose; stem up to 4 mm thick, generally short, white, sub-tomentose at the base; smell of new meal.

Spores white, globose, ± thin-walled, smooth, with a large gutta, 4-6 μ wide.

On the ground in open pastures and in woods. Common.


6 a. **Clavulinopsis corniculata** forma **compacta** f. nov.

Fig. 27 c and d, p. 141.

Icones: F. H. M. 1940 and 1942 (C); M. P. C. 1943, f. 3 and 4 (C).

Fruit-bodies up to 4 cm high, much branched, compact, with the branchlet forming a level top, tips with 2-3 very short branches, egg-yellow; smell often none.
Spores white, globose, 3.7-5.5 μ wide; (a single find with spores
6.5-7 μ wide).

On the ground in open pastures. Common.

Finds: Z. Vallø Dyrehave (40), Nov. 12, 1942!; Billesborg-Engen (40),
Oct. 14, 1943!.

7. **Lentaria** Corner 1950.

Fruit-bodies often small and slender, varying branched to sub-

simple, white, alutaceous, becoming flesh-colour to brownish, or
violaceous.

Hyphae monomitic, clamped; basidia clavate, often 4-spored;
spores white ± ellipsoid, smooth.

Lignicolous.

Type-species: *L. surculus* (BERK.) CORNER.

Key to Species

1. Fruit-bodies 1.5-2.5 cm high, sparingly branched, white, be-
coming pale violet or purplish, tips obtuse, somewhat,
brownish; stem not attached by floccose membranous myce-

lium ................................................... 1. *L. afflata*, p. 142

Fruit-bodies 0.5-2 cm high, branched, white, tips acute;
stem 0.5 cm high, arising from a byssoid or floccose mem-

branous mycelium ...................................... 2. *L. epichnoa*, p. 143

1. **Lentaria afflata** (LAGGER) CORNER 1950.

Fig. 28 a and b, p. 143.

Syn.: *Clavaria afflata* LAGGER 1836, p. 231 sensu BOURD. & GALZ. 1928.

Icones: F. H. M. 1940 (C); M. P. C. 1940 (C).


Fruit-bodies slender, 1.5-2.5 cm high (3.5 cm high on sawdust),
branched, divaricate and fastigiate, above dichotomous, terminal
branches 2-7 mm long and c. 1 mm wide, obtuse to subacute, first
white, then pale with violet tinge, or purplish red and with somewhat
orange-brown tips, above minutely sulcate; stem short, c. 1.2-1.5 mm
thick, pale yellowish, tomentose; smell and taste none.

Basidia clavate, 4-spored; spores white, ellipsoid, smooth, thin-
walled, with 1-few guttulae, 4.5-7.5 × 2.5-3.5 μ.
Fig. 28. *Lentaria afflata* (LAGGER) CORNER. Vallø Storskov. a. Fruit-bodies (× 1/2); b. Basidium and spores (× 1000.) — *Lentaria epichnoa* (Fr.) CORNER. Valle Storskov. c. Fruit-bodies (× 1/2); d. Spores (× 1000). — Svebølle. e. Fruit-bodies (× 1/2); f. Basidia and spores (× 1000). — Langdalen. g. Fruit-bodies (× 1/2); h. Basidia and spores (× 1000).

On dead wood (*Fagus*) and on sawdust. Rare.

Previously reported from Sweden and France. — *L. epichnoa* may be identical, for they have the same habitat and spores (CORNER).

Finds: Z. Valle Storskov (40), on sawdust, a very great collection, Sept. 29, - Oct. 12, 1940 and Nov. 10, 1942.

2. *Lentaria epichnoa* (Fr.) CORNER 1950.

Fig. 28 c-h, p. 143.

Syn.: *Clavaria epichnoa* Fr. 1874, p. 670.


Fruit-bodies 0.5-2 cm high, white, branched, solitary to clustered, much branched above; branches slender, filiform, acute, below becoming flattened; stem up to 0.5 cm high, arising from a byssoid, white, or whitish mycelium.
Hyphae thin-walled, cylindric, rarely inflated; basidia c. 16 × 4.8 μ, with 4 sterigmata up to 5 μ long; spores white, ellipsoid, smooth, 5.5-8 × 3.5 μ, non amyloid.

On dead wood, sawdust and dead stem of fern. Rare.


8. **PTERULA** Fr. 1825.

Fruit-bodies branched, or simple; stem generally distinct, short and slender; branches c. 0.3-1 mm wide, slender, with finely subulate and filiform tips.

Hyphae dimitic, generative hyphae generally with clamps; basidia 2-4 spored; spores white, ellipsoid to subglobose, aguttate; taste of carbolic.

Type-species: *P. subulata* Fr.

**Pterula multifida** Fr. 1830.


Fruit-bodies 1-5 cm high, much branched from the base, ± caespitose, pallid whitish, then dirty pale yellowish, finally brownish, tough, or cartilaginous; branches tense, hairshaped, straight.

Vegetative hyphae thick-walled, without septa; generative hyphae thin-walled, and with septa and clamps.

Basidia clavate, c. 20 × 4 μ.

Spores 4.5-6.0 × 2-3 μ.

On coniferous needles and branches. Rare.

Finds: Z. Vallo Storskov (40), Sept. 28, 1930!; Hornbæk Plantage (45 b), Sept. 30, 1956, leg. BREGNHØJ-LARSEN, det.!

Fruit-bodies massive-small, branched, poly- or dichotomous, generally coloured, or pallid white, brittle, fleshy, coriaceous, or tough; flesh often vinescent, or rufescent.

Hyphae monomitic, clamped; basidia often 4-spored; spores pale yellow, ochraceous, or ferruginous, mostly ellipsoid, smooth, striate, verruculose, or echinulate, generally with one to several guttulae.

Terrestrial in humus or lignicolous.

Type-species: R. botrytis (Pers. ex Fr.) Ricken (Lecto-type).

Key to Species

1. Spores echinulate, or verruculose ........................................ 2
   Spores rough, or smooth ............................................. 4

2. Under frondose trees (Fraxinus); Fruit-bodies small to medium-size, 5-9 cm high, yellow-brown to brownish, forming fairy-ring; spores ellipsoid, minutely echinulate, 5.2-7 × 3.2-3.7 μ ............................... 1. R. eumorpha, p. 146
   Under conifers; spores ellipsoid to narrowly pyriform ...... 3

3. Spores echinulate, 6-8 × 3.5-4.5 μ; fruit-bodies small, generally deep ochraceous to brownish, not greenish on bruising
   Spores verruculose, 6-8 × 3-4 μ; fruit-bodies small to medium-size, very compact, ochraceous, greenish on bruising
   3. R. ochraceo-virens, p. 148

4. Lignicolous, or terrestrial with abundant mycelium at the base of the fruit-bodies, small to medium-size, white to yellow, ochraceous to brownish; hyphae thick-walled ...... 5
   Terrestrial, mostly medium-size to large; hyphae with thin to very slightly thickened walls; spores often large ...... 7

5. Terrestrial, fragrant, white to yellow, then pale ochraceous; spores 5-7 × 3-4 μ, guttate; under conifers ............... 4. R. gracilis, p. 149
   Lignicolous ...................................................................... 6

6. Medium-size; branches straight, fastigiate, pallid yellow to ochraceous, then brownish; spores minutely rough, or nearly smooth, 7.5-10 × 3.5-5 μ ....................... 5. R. stricta, p. 150
   Larger; fruit-bodies very compact; spores 7-8 × 3.5-4.5 μ; on sawdust ............... 5 a. R. stricta forma compacta, p. 150
7. Branch-tips deep red to purple, obscurely pinkish, yellow-incarnate, or pale lilac ........................................... 8
   Branch-tips lemon-yellow, sulphur-yellow, or orange-yellow ................. 10

8. Spores striate, 11.5-16.5 × 4.8-6 μ; tips deep red, or purple
   Spores not striate ........................................................................ 9

9. Spores 8-10.5 × 4-5 μ; tips obscurely pinkish ......................... 7. R. rufescens, p. 152
   Spores 10-15(-20) × 4-5.5 μ; tips yellow-incarnate, or pale lilac .............. 8. R. pseudobotrytis, p. 153

10. Fruit-bodies pinkish buff to orange-rose; tips lemon-yellow;
    stem massive, distinct; often in fairy rings .................................. 9. R. formosa, p. 154
    Fruit-bodies bright yellow, ochraceous, or orange; flesh in
    some cases reddening, or vinescent ........................................ 11

11. Fruit-bodies sulphur-yellow; stem reddening with age, or on
    bruising .............................................................. 10. R. flava, p. 154
    Fruit-bodies first orange, then entirely golden ochraceous,
    or egg-yellow, very compact, shortly branched, not reddening
    on bruising .............................................................. 11. R. aurea, p. 155

1. Ramaria eumorpha (Karst.) Corner 1950.
   Fig. 30 a, p. 147.

Syn.: Clavariella eumorpha Karst. 1882, p. 185.

Fruit-bodies 5-9 cm high, caespitose, or fasciculate, yellow-brown to brownish (h 2), tips concolorous; stem 2-4 cm wide, arising from a white mycelial felt, or treadlike rhizomorphs; branches numerous, much branched, dichotomous, erect, crowded. Branchlets ending with 1-3, short, acute tips.

Hyphae 3-5 μ broad, without clamps (?); spores yellow, ellipsoid, thin-walled, finely echinulate, 5.2-7 × 3.2-3.7 μ.

On the ground under Fraxinus, forming a large (4 m broad) fairy-ring. Very rare. Hitherto only reported from Finland.

Finds: Z. Ermelunden (45 a), under Fraxinus on low ground, Aug. 13, 1951 and July 28, 1953.


Fig. 30 b, p. 147 and fig. 31, p. 148.

Syn.: *Clavaria invalii* COTTON & WAKEFIELD 1919, p. 176; *Clavaria abietina* FR. 1821, p. 469.


Fruit-bodies 4-8 cm high, solitary, or caespitose, ochre, becoming yellowish brown-ochre in age, tips concolorous, or pallid; stem (f 8- f 6) 1-2.5 cm × 3-15 mm, often tomentose with a white mycelial felt and tread-like rhizomorphs; branches (k 5-g 2) numerous, much branched, erect, fastigiate, cylindric, soon dichotomous with elongate internodes, tapered ends 1-1.5 mm wide; flesh white, rather tough.

Basidia 7-8 µ broad, 4-spored; Spores ochraceous, ellipsoid to pip-shaped, finely echinulate, spines hyaline, 6-8 × 3.5-4.5 µ.

On the ground in coniferous woods. Not rare.

Finds: Z. Vallo Storskov (40), Sept. 28, 1930 and Oct. 19, 1940!; Lellinge Skov (40), Oct. 10, 1940!; Kirstineberg Storskov (37), May 12, 1941, F. H. M.
Fig. 31. Ramaria invalii (Cott. & Wakef.) Donk. In coniferous wood (Picea abies). — Z. Vallo Storskov, October 19, 1940! (× 1/1).

3. Ramaria ochraceo-virens (Jungh.) Donk 1933.

Fig. 30 c, p. 143 and fig. 32, p. 144.


Icones: Konr. & Maubl. 1934, t. 489, 1; Corner 1950, pl. 13, f. 1 and 2; Michael & Hennig II, 1960, p. 258, f. 132.


Fig. 32. Ramaria ochraceo-virens (Jungh.) Donk. In coniferous wood (Picea abies). — Z. Valle Storskov, October 19, 1940! (× 1/1).
Fruit-bodies c. 4 cm high and wide, compact, ochraceous, or olive-ochraceous, greenish when bruised, caespitose from a floccose white mycelium with rhizomorphs; stem short, soon branched, branches numerous, crowded, erect, polychotomous, then dichotomous; flesh greenish, rather tough; taste bitterich.

Spores brownish ochraceous, finely verruculose, narrowly pyriform, thin-walled, 6-8 × 3-4 μ.

On the ground in coniferous woods. Common.


Fig. 30 d, p. 147 and fig. 33, p. 149.

Syn.: *Clavaria gracilis* Pers. ex Fr. 1821, p. 475.
Icones: F. H. M. 1940 (C); Corner 1950, pl. 13, f. 5.

Fruit-bodies 3-5 cm high and c. 3 cm broad, mostly caespitose, slender, densely and finely branched, whitish to whitish-brown, tips short, subacute to subcristate white. Stem 1-1.5 cm × 2-4 mm, with white, floccose mycelial strands at the base; smell of aniseed.

Spores light yellow, short oblong, verruculose to minutely rough, 4.5-6 × 3-4 μ.

On the ground in coniferous woods, often in dense fairy-rings. Rather rare.

---

Fig. 33. *Ramaria gracilis* (Fr.) Quél. In coniferous wood (*Picea abies*). Z. Lellinge Skov, September 26, 1940! (X ½).
The species resembles somewhat *Ramariopsis Kunzei*, but this species has smaller spores.

**Finds:** Z. Granskov near Kege (40), Sept. 1932; Lellinge Skov (40), Sept. 26. and Oct. 10, 1940; Vallo Storskov (40), Sept. 21, 1924 (spores 5.7 × 2.5-3 μ), and Oct. 10, 1940; Amager. Kongelunden (46), Oct. 6, 1935, leg. H. V. Ræsvkjær.

5. **Ramaria stricta** (Pers. ex Fr.) Quél 1888.

**Fig. 30 e, p. 147.**

**Syn.:** *Clavaria stricta* Pers. ex Fr. 1821, p. 468.


Fruit-bodies 4-8 × 3-6 cm, often caespitose, pallid-yellow to ochraceous, then brownish; tips clear yellow, all parts becoming fuscous or vinous on bruising, branch-angel often covered with spore print; stem 1-5 cm × 3-6 mm, pale, arising from a white mycelium or thread-like rhizomorphs; branches numerous, dichotomous, straight, fastigiate, subparallel, acute; flesh whitish to yellowish; taste bitter; smell faint.

Spores yellowish, oblong, smooth, or minutely rough, 7.5-10.5 × 3.5-5 μ.

On dead wood, trunks, branches of frondose and coniferous trees. Common.

**Finds:** Z. Gjorslev Bøgeskov (39 a), Aug. 24, 1930; Vallo Storskov (40), Sept. 28, 1930; Aashej Overdrev (40), Sept. 18, 1932; Skovhusvenge (40), Oct. 1940.

5 a. **Ramaria stricta** forma **compacta** nov. forma.

**Fig. 30 f, p. 147, and fig. 34, p. 151.**

**Icones:** F. H. M. 1940 (C).

Fruit-bodies ovate, 5 × 4 to 10 × 10 cm. above somewhat tapering, yellow to ochraceous (g 3), tips laete citron-yellow, all parts becoming brownish lilac (j 2), branched from the base; branches numerous, very densely crowed, compact, below polychomous, above dichotomous, terminally bifid, 2-3, 0.5-1 mm wide, acute; larger branches with white flesh; taste somewhat bitter; smell faint.
Fig. 34. *Ramaria stricta* (PERS. ex Fr.) QUEL. f. *compacta* n. f. — Vallø Storskov, Sept. 28, 1940. a. Fruit-body ($\times \frac{2}{3}$); b. twig of fruit-body ($\times \frac{1}{3}$).

Spore print yellow (thin layer), ochraceous (thick layer); spores oblong-elliptic, thin-walled to ± rough, with granular contents, 7-8 $\times$ 3.5-4.5 $\mu$m.

On sawdust arising from a white mycelial felt, or thread-like rhizomorphs. Rare.

Finds: Vallø Storskov (40), great many specimens, on 2 square-meter about 200 specimens, Sept. 28 and Nov. 11, 1940!; do. Oct. 4, 1941!.


Fig. 35 a, p. 152.

Syn.: *Clavaria botrytis* Pers. ex Fr., 1821, p. 466.


Fruit-bodies 3-8 cm high and broad, white then alutaceous, or ochraceous, with deep red, or purple tips; stem 3-4 $\times$ 2-6 cm, massive, white, then yellowish, passing into numerous, crowded, thick, irregular branches; flesh white, ± brittle; smell pleasant. Edible.

Spores oblong-ellipsoid, thin-walled, longitudinally striate, smooth, 11.5-16.5 × 4.8-6 μ.

On the ground in frondose woods (Fagus). Rather rare.

Finds: Z. Køge Aas (40), Aug. 27, 1920!; Faxe Ladeplads (39 b), Aug. 17, 1930!; Krageskov (40), Sept. 1941!; Fuglsangskoven (40), Sept. 15, 1940! and F. H. M. and 1942!; L. Frejlev Skov (36), Sept. 26, 1940, F. H. M.

7. Ramaria rufescens (Fr.) Corner 1950.

Fig. 35 b, p. 152.

Syn.: Clavaria rufescens Fr. 1838, p. 74.
Lit.: J. L. 1913, p. 366.
Fruit-bodies 7-10 cm high, 3–6 cm wide, massive, whitish, then pale ochraceous, with obscurely pinkish tips; stem c. 5 × 3 cm, pallid; branches polychotomous below, short and massive, crowded, much branched, with very numerous dichotomous tips; flesh white, slightly tough; taste subacid. Edible.

Spores yellow, oblong-ellipsoid, thin-walled, smooth, or slightly rough (not striate as by *R. botrytis*), with granular, or guttulate contents, 8-10.5 × 4–5 μ.

On the ground in frondose woods. Rare.


8. **Ramaria pseudobotrytis** n. sp.

Fructificatio major, 7-15 × 5-11 cm, coralloides, ramosissima, albido-brunnea vel alutaceo-brunnea, stipite c. 5 × 3 cm, leviter conico vel subbulbosus, albopallido; ramis ab initio crassis, ramosis, teretiusculis, tenuiter rugulosis, ramulis longiusculis, saepe bifurcatis, acutis, apice parce incarnatis vel pallido-lilaceis, caro albido.

Hyphae hyalinae, cylindraceae, septatae, tenuiter tunicatae, 4-9 μ diam.; basidia clavata, c. 40 × 7-9 μ, 2-4 sterigmata gerentia; sporae leviter ochraceo-luteae, cylindraceae vel subcylindraceae, granulosae vel pluri-guttulatae, tunicis subtenuibus, sublaevibus, interdum striatis, 10-15(-20) × 4-5.5 μ.

In faginetis ad terram. Dania. Autumno.

Fruit-bodies 7-15 × 5-11 cm, stem distinct, 2-8 × 2-4 cm, pallid white at base; branches numerous, elongate, fairly crowded, dichotomous, longitudinally rugulose, with cm-long, acute, or shortly incurved, crescentic, subulate tips; larger branches whitish-brown, pale
brownish, or alutaceous, the young branches generally yellow-incarnate, or pale lilac towards the ends; flesh white, rather brittle; taste somewhat bitter.

Spores pale ochraceous-yellow, finely rough, oblong, ellipsoid, with granular, guttulate contents, 10-15(-20) × 4.5-5 μ.

On the ground in frondose woods. Rare.

My species in very close to *Ramaria pallida* (SCHAEFFER ex BRES.), *R. Mairei* DONK and particularly to *R. botrytis*. I have never met with *Ramaria pallida* sensu F. & W. (1943).

Finds: Z. Valle Pramskov (40), Sept. 28, 1940 and Oct. 1, 1941!; Vintersbølle Skov (39 a), July 21, 1941!; Krageskov (40), Sept. 16 and 22, 1942!; F. Korselitze Skov (37), Aug. 25, 1941, F. H. M.


Fig. 35 d, p. 152.

**Syn.:** *Clavaria formosa* Pers. ex Fr. 1821, p. 466.

**Icones:** JUILLARD-HARTMANN 1919, Vol. 5, pl. 214, f. 6; BRES. 1922, Icon. Myc., t. 1087 (too red); F. H. M. 1940 (C).


Fruit-bodies 8-15 cm high and broad, caespitose; stem white, 3-6 cm high, soon breaking up into many, dense branches, polychotomous below, terminally bifid, often longitudinally rugulose, pale flesh-coloured, orange-rose, or pinkish ochraceous, with lemon-yellow tips, blunt or subacute. Poisonous (CORNER).

Spores ochraceous, oblong-elliptic, thin-walled, ± rough, with granular contents, 8.5-11 × 4-5 μ.

On the ground in humus in frondose woods, often in large fairy-rings. Not rare.


10. **Ramaria flava** (Fr.) Quél. 1888.

Fig. 35 e, p. 152.

**Syn.:** *Clavaria flava* Fr. 1821, p. 467.

**Icones:** KONR. & MAUBL. 1926, pl. 491; F. H. M. 1940 (C).

Fruit-bodies c. 10 cm high, sulphur yellow; stem 3-4 × 2-3 cm, whitish at the base, reddish or bloodred with age, or on bruising; branches ± crowded, compressed, fastigiate, dichotomous above; flesh white to pale yellowish, fragile, brittle, often reddening when bruised; taste none; smell of champignon. Edible.

Spores pale yellow, oblong-elliptic, thin-walled, almost smooth, 9-10 × 4-5 μ.

On the ground in frondose woods (Fagus). Rather rare.

I understand this species exactly as Konrad & Maublanc.


11. **Ramaria aurea** (Schaeff. ex Fr.) Quél. 1888.

F. 35 f. p. 152.

Syn.: Clavaria aurea Fr., Epicer. 1838, p. 574.


Fruit-bodies 6-12 cm high and broad, massive, first orange, then entirely golden ochraceous, or egg-yellow; branches rather short, dense; stem 3-4 × 2-5 cm, white at the base; flesh white, yellowish near the surface, rather brittle. Edible?

Spores deep ochraceous, rough or nearly smooth, oblong, 8-10,5 × 4-4.5 μ.

On the ground in frondose woods (Fagus). Rare.

Finds: Z. Pramskov (40), Oct. 2, 1940!; Skovhusvænge (40), Oct. 10, 1940 and Sept. 24, 1943!; Krageskov (40), 1943!.

10. **Ramariopsis** Donk 1933.

Fruit-bodies branched, rarely simple, variously coloured, waxy-fleshy, brittle; stem rather slender, often white villous; branches dichotomous, cylindric.

Basidia clavate, 4(-2)-spored; spores white, ellipsoid or sub-globose, finely echinulate; hyphae inflating, clamped, 4-10 μ wide.

Terrestrial.

Type-species: *R. Kunzei* (Fr.) Donk.
Ramariopsis Kunzei (FR.) DONK 1933 emend. CORNER 1950.

Syn.: Clavaria Kunzei FR. 1821, p. 474.
Icones: F. H. M. 1941 (C); M. P. C. 1943 (C).

Fruit-bodies c. 5 cm high, white, becoming cream-white to yellowish, gregarious, or caespitose, much branched, more or less brittle; stem (2-4 mm wide) and base of the main branches villose-tomentose; smell and taste none.

Basidia 4-spored; spores white, broadly ellipsoid, minutely echinulate, 1-guttate, c. 5 × 4 μ.

In pastures and meadow. Rare.


APPENDIX.


Icones: CORNER 1950, Text-Fig. 88, p. 245, pl. 1, f. 5 and 6; F. H. M. 1960 (C).

Spores 6.5-10 × 3.5-6.5 μ, mostly 7-9 × 4.5-5.5 μ. (CORNER 1950, Text-Fig. 88).

Finds: L. Thoreby Skov (36), Sept. 8, 1960, leg. L. Døssing.

Fig. 38. Clavaria incarnata Weinm. — Thoreby Skov. Fruit-body (× 1/4).
11. Clavaria rosea Fr. 1821.

*Icones:* F. H. M. (C).
*Lit.:* CORNER 1950, p. 248.

Spores oblong, thin-walled, smooth, 5-7 × 2.5-3 μ (F. H. M.); 5-8 × 2.5-3.5 μ (CORNER).

Finds: J. Blichers Plantage (13 b), July 29, 1946, leg. A. HAUFERBACH.

---

**SPECIES LISTED**

- **Aphelaria acericola** n. sp.
- **Ceratellopsis acuminata**
- **Clavaria acuta**
  - affinis
  - argillacea
  - fumosa
  - *Gibbsiae* var. megaspora.
  - = tenuis
  - incarnata
  - purpurea
  - rosea
  - (?) rosea var. subglobosa
  - sphagnicola
  - vermicularis
- **Clavariadelphus fistulosus**
  - var. contortus
  - *junceus*
  - *ligula*
  - *pistillaris*
- **Clavulinopsis coliformis**
  - corniculata
  - — f. compacta n.f.
  - fusiformis
  - helvola
  - — var. geoglossoides
  - luteo-alba
  - pulchra
- **Lentaria afflata**
  - epichnoa
- **Pterula multifida**
- **Ramaria aurea**
  - botrytis
  - eumorpha
  - flavia
  - formosa
  - gracilis
  - invalidi
  - ochraceo-virens
  - pseudobotrytis n. sp.
  - rufescens
  - stricta
  - — forma compacta n.f.
- **Ramariopsis Kunzei**
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(incl. synonyms*)

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